## REMARKS

Reconsideration of the application, as amended, is respectfully requested.

## I. STATUS OF CLAIMS

Claims 1, 2, 4, 5, 7-13, 22, 23 and 26-29 are pending in this application. Claims 1, 22 and 26 have been amended herewith to more particularly point out and distinctly claim that which applicants regard as their invention. Moreover, claims 2, 27 and 28 have been canceled herewith without prejudice.

Support for the above amendments may be found throughout the specification as originally filed. No new matter has been added by virtue of this amendment.

## II. 35 U.S.C. 103(a) REJECTIONS

**(i) Claims 1, 2, 4, 5, 7, 11, 12, 13, 22, 23 and 26-29 have been rejected under 35 U.S.C. 103(a) as being unpatentable over by U.S. Patent No. 6,927,410 to Chen ("the Chen patent") in view of U.S. Patent No. 6,943,365 to Lowrey et al ("the Lowrey patent") and Hun Seo et al publication , entitled "Investigation of Crystallization Behavior of Sputter-Deposited Nitrogen-Doped Amorphous $Ge_2Sb_2Te_5$ Thin films; Jpn. J. Appl. Phys. Vol.39 (2000) 745-751; Part 1, No. 2B, 28 February 2000 ("the Hun Seo publication").**

**(ii) Claims 9 and 10 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Chen and Lowrey as discussed above, in view of U.S. Patent No. 5,536,947 to Klersy et al. ("the Klersy patent").**

**(iii) Claim 8 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Chen and Lowrey as discussed above, in view of U.S. Patent Application Publication No. 2004/0178401 to Ovshinsky et al. ("the Ovshinsky publication").**

In response, it is submitted that Chen, Lowrey, Seo, Klersy and Ovshinsky alone or in combination fail to teach or suggest all of the features recited in amended claims 1, 22 and 26.

In particular, Chen, Lowrey, Seo, Klersy and Ovshinsky each at the very least fail to teach or suggest a multi-bit phase change memory cell (claims 1 and 26) or a multi-bit phase change memory (claim 22), wherein the multi-bit phase change memory cell (claims 1 and 26) or multi-bit phase change memory cells (claim 22), is adapted such that when each of the plurality of phase change material layers are in an amorphous state then each of the plurality of phase change material layers each have the same resistivity and the electrical resistance of each of the plurality of phase change material layers increases along the direction from the first outer conductive layer to the second outer conductive layer, as essentially recited in amended claims 1, 22 and 26.

None of the cited references of Chen, Lowrey, Seo, Klersy and Ovshinsky teaches or suggests a multi-bit phase change memory cell or multi-bit phase change memory which provides the specific combination of resistivity and electrical resistance properties mentioned above for the phase change material layers when the phase change material layers are each in an amorphous state as now recited in amended claims 1, 22 and 26.

It is noted that while Chen may discuss memory materials which can be switched between generally amorphous and generally crystalline states as pointed out by the Examiner in the instant Office Action, the Chen reference at the very least still fails to teach or suggest a multi-bit memory cell or a multi-bit phase change memory which includes a plurality of phase change material layers each having the same resistivity and wherein the electrical resistance of each of the plurality of phase change material layers increasing along the direction from the first outer conductive layer to the second outer conductive layer when each of the plurality of phase change material layers are in an amorphous state, as required by amended claims 1, 22 and 26.

Rather, Chen discusses its phase change materials switching between high resistivity to low resistivity, but Chen makes no specific reference to providing a multi-bit memory cell which includes a plurality of phase change material layers each having the same resistivity when each of the plurality of phase change material layers are in an amorphous state as required by amended claim 1, 22, and 26.

In addition, it is also submitted that Chen fails to teach or suggest a multi-bit memory cell wherein the electrical resistance of each of the plurality of phase change material layers increasing along the direction from the first outer conductive layer to the second outer conductive layer when each of the plurality of phase change material layers are in an amorphous state, as required by amended claims 1, 22 and 26. It is respectfully submitted that contrary to the Examiner's position on page 6 of the instant Office Action, Applicants do not see a connection between Fig. 6 of Chen and a teaching by Chen of setting the electrical resistances of each of the plurality of phase change material layers in an increasing manner, sequentially from layer 1 to layer 5, pointing to a direction from the first outer conductive layer to the second outer conductive layer. The values for $R_1$, $R_2$, $R_3$, $R_4$ and $R_5$ in Fig. 6 of Chen do not represent separate electrical resistance values for each of five consecutive individual phase change material layers (layer 1 to layer 5) as asserted by the Examiner in the instant Office Action. Instead, Fig. 6 of Chen illustrates the resistivity of memory material as a function of the number of crystallizing thermal pulses, but does not specifically teach or suggest the electrical resistance of each of a plurality of phase change material layers increasing along the direction from the first outer conductive layer to the second outer conductive layer when each of the plurality of phase change material layers are in an amorphous state, as required by amended claims 1, 22 and 26.

Therefore, for at least the reasons set forth above, Chen fails to teach or suggest a multi-bit phase change memory cell or a multi-bit phase change memory, which includes all of the features as recited in amended claims 1, 22 and 26. Moreover, the remaining references of Lowrey, Seo, Klersy and Ovshinsky fail to cure all of the above-mentioned deficiencies of Chen because Lowrey, Seo, Klersy and Ovshinsky each likewise at the very least fail to teach or suggest a multi-bit phase change memory cell (claims 1 and 26) or a multi-bit phase change memory (claim 22), wherein the multi-bit phase change memory cell (claims 1 and 26) or multi-bit phase change memory cells (claim 22), is adapted such that when each of the plurality of phase change material layers are in an amorphous state then each of the plurality of phase change material layers each have the same resistivity and the electrical resistance of each of the plurality of phase change material layers increases along the direction from the first outer conductive layer to the second outer conductive layer, as essentially recited in amended claims 1, 22 and 26.

Consequently, even if Chen, Lowrey, Seo, Klersy and Ovshinsky were combined, one skilled in the art would still not arrive at a multi-bit phase change memory cell or a multi-bit phase change memory having all of the features, including the specific combination of resistivity and electrical resistance properties mentioned above for the phase change material layers when the phase change material layers are each in an amorphous state , as recited in amended claims 1, 22 and 26, for at least the reasons set forth above.

Furthermore, additional support for the patentability of amended claims 1, 22 and 26 is that with all of the difficulties encountered with designing conventional multi-bit phase change memory cells and conventional multi-bit phase change memories **(see pages 2-4 of the present specification)**, and with all of the many possible ways to design these multi-bit phase change

memory cells, the Examiner has failed to provide sufficient motivation on the record as to why one skilled in the art would have motivated or guided to provide the particular multi-bit phase change memory cell or multi-bit phase change memory having all of the features including the specific combination of resistivity and electrical resistance properties mentioned above for the phase change material layers when the phase change material layers are each in an amorphous state as recited in amended claims 1, 22 and 26 of the presently claimed invention.

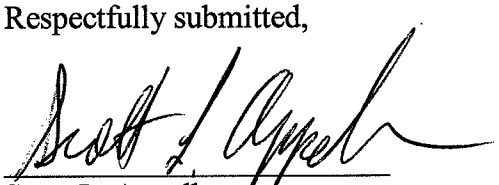
Therefore, for at least the reasons set forth above, withdrawal of the rejections to claims 1, 22 and 26 is respectfully requested. As claims 4, 5, and 7-13 depend from claim 1, claim 23 depends from claim 22 and claim 29 depends from claim 26, withdrawal of the rejection to these dependent claims is likewise requested.

## III. CONCLUSION:

In summary, applicants respectfully submit that the instant application is in condition for allowance. Early notice to that end is earnestly solicited.

If a telephone conference would be of assistance in furthering prosecution of the subject application, applicant requests that the undersigned be contacted at the number below.

Respectfully submitted,



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